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Indian Standard

SPECIFICATION FOR PHOSPHOR BRONZE RODS AND BARS

(*First Revision*)

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2 *August* 1986

AMENDMENT NO. 4 MAY 2008
TO
IS 7811 : 1985 SPECIFICATION FOR PHOSPHOR BRONZE RODS AND BARS

(First Revision)

[*Page* 5, *clause* **6.2**, *Lead*, *Max* (*see also Amendment No.* 3)] — Substitute ‘0.05’ *for* ‘0.02’.

(MTD 8)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 AUGUST 2004
TO
IS 7811 : 1985 PHOSPHOR BRONZE RODS AND BARS

(First Revision)

(*Page* 5, *clause* **6.2**) — Substitute the following for the existing:

Constituent	*Percent*
Tin	4.2-5.5
Phosphorus	0.02-0.40
Lead, *Max*	0.02
Zinc, *Max*	0.30
Total Impuities, *Max*	0.50
Copper	Remainder

(MTD 8)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 JUNE 2004
TO
IS 7811 : 1985 SPECIFICATION FOR PHOSPHOR BRONZE RODS AND BARS

(*First Revision*)

(*Page* 4, *clause* 3.1, *line* 2) — Substitute 'IS 1387 : 1993†' *for* 'IS : 1387 - 1967†'.

(*Page* 4, *footnote marked* '†') — Substitute the following for the existing footnote:

'†General requirements for the supply of metallurgical materials (*second revision*).'

(*Page* 5, *clause* 7.1.1, *line* 2) — Substitute 'IS 1608 : 1995†' *for* 'IS : 2654 - 1977†'.

(*Page* 5, *footnote marked* '†') — Substitute the following for the existing footnote:

'†Mechanical testing of metals — Tensile testing (*second revision*).'

(MTD 8)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 FEBRUARY 1993
TO
IS 7811 : 1985 SPECIFICATION FOR PHOSPHOR BRONZE RODS AND BARS

(First Revision)

(*Page* 5, *clause* **6.2**) — Substitute '4.0 to 5.5' *for* '4.2 to 5.5' against the requirment of tin.

(MTD 8)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR PHOSPHOR BRONZE RODS AND BARS

(First Revision)

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(*Continued on page* 2)

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(*Continued on page* 8)

Indian Standard

SPECIFICATION FOR PHOSPHOR BRONZE RODS AND BARS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 22 September 1985, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 The requirements for phosphor bronze rods and bars, sheet and strip and wire were covered earlier in IS : 1385-1968*. The Sectional Committee decided to cover the requirement for rod and bar, sheet and strip and wire in three separate standards. As a result this standard was first published in 1975. This standard is being revised to incorporate experiences gained during these years. In this revision following modifications have been made:

a) With the revision of IS : 3288 (Part 1) - 1981†, the definition of rod/bar has been modified;

b) Chemical composition and mechanical properties have been modified; and

c) Clauses for chemical composition, size and tolerances, sampling and criteria for conformity and retest have been modified.

0.3 This standard contains clauses **5.1**, **8.1**, **9.0**, **11.1**, and **12.1**, where the purchaser is allowed to exercise his option and which call for an agreement between the purchaser and the manufacturer.

0.4 In preparation of this standard, the Sectional Committee kept in view the manufacturing and trade practices followed in the country in this field.

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*Phosphor bronze rods and bars, sheet and strip and wire (*first revision*).

†Glossary of terms for copper and copper alloys: Part 1 Cast form and wrought form (main types) (*second revision*).

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for phosphor bronze rods and bars.

2. TERMINOLOGY

2.1 For the purpose of this standard, the following definition shall apply.

2.1.1 *Rod/Bar* — A solid wrought product of uniform cross section along its whole length, supplied in straight length or coil form, whose width or greatest distance between parallel faces is greater than 6 mm.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall conform to IS : 1387-1967†.

4. FREEDOM FROM DEFECTS

4.1 The material shall be free from porosity and other defects.

5. CONDITION

5.1 The material shall be suitably stress-relieved, if required by the purchaser.

6. CHEMICAL COMPOSITION

6.1 The material shall have the following composition.

---

*Rules for rounding off numerical values (*revised*).

†General requirements for the supply of metallurgical materials (*first revision*).

6.2 The chemical composition shall be determined either by the method specified in IS : 4027-1967* or any other established instrumental/chemical method. In case of dispute, the procedure specified in IS : 4027-1967* shall be the referee method.

Constituent	*Percent*
Tin	4·2 to 5·5
Phosphorus	0·02 to 0·40
Lead	0·020, *Max*
Zinc	0·030, *Max*
Total impurities, *Max* (including zinc)	0·050, *Max*
Copper	Remainder

7. MECHANICAL PROPERTIES

7.1 Tensile Test — The material shall have mechanical properties as given in Table 1.

7.1.1 The test pieces selected in accordance with **9.3** shall be machined and tested in accordance with IS : 2654-1977†.

8. SIZES AND TOLERANCES

8.1 Sizes — The material shall be supplied in any of the sizes specified in IS : 2826-1986‡ or as agreed by the purchaser and the manufacturer.

8.2 Tolerances — The tolerance for rods/bars shall be as given in IS : 2826-1986‡.

9. SAMPLING AND CRITERIA FOR CONFORMITY

9.0 Unless otherwise decided by mutual agreement of the purchaser and the supplier, the following sampling procedure and criteria for conformity shall hold good.

9.1 Lot — All the rods/bars of same dimensions, and manufactured under similar condition of production shall be grouped together to form lots of not more than 1 000 kg in mass. If the consignment exceed 1 000 kg, two or more lots shall be formed and each lot shall be sampled separately for acceptance purposes.

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*Methods of chemical analysis of bronzes.

†Method for tensile testing of copper and copper alloys (*first revision*).

‡Dimensions for copper and copper alloy rod and bar for general engineering purposes (*third revision*).

TABLE 1 MECHANICAL PROPERTIES OF PHOSPHOR BRONZE BARS/RODS

(*Clause* 7.1)

CROSS SECTIONAL THICKNESS		CONDITION	*0·2 PERCENT PROOF STRESS *Min* MPa	TENSILE STRENGTH *Min* MPa	ELONGATION ON GAUGE LENGTH OF 5.65 $\sqrt{A}$, *Min* PERCENT
Over mm	Up to and Including, mm				
(1)	(2)	(3)	(4)	(5)	(6)
6	18	As manufactured	410	500	12
18	38	,,	380	460	12
38	70	,,	315	380	16
70	100	,,	235	315	20
100	120	,,	118	275	22
120	—	,,	80	255	25

NOTE — For rods/bars required for electrical purposes, the conductivity/resistivity required as well as physical properties shall be as agreed to between the purchaser and the manufacturer.

*For information only.

9.2 From each bundle, 10 rods/bars shall be selected at random and be examined for visual and dimensional requirements. A rod/bar which fails in one or more of the requirements shall be termed as 'defective'. From the samples examined in each bundle not more than one defective shall be permitted. If this is exceeded, all the material in the bundle shall be subject to visual and dimensional inspection.

9.3 Chemical Composition and Mechanical Properties — The following shall be the number of tests for chemical composition and mechanical properties requirements in the lot:

Specified Size (Diameter or Width Across Flats) of the Material		*Number of Tests for Chemical Composition and Mechanical Properties*
Over mm	Up to and Including mm	
—	12	One for every 250 kg or part thereof
12	40	One for every 500 kg or part thereof
40	80	One for every 1 000 kg or part thereof
80	—	One for every 2 000 kg or part thereof

9.3.1 For this purpose the sample may be selected from rods/bars which have been examined and found satisfactory for visual and dimensional requirements.

9.3.2 The lot shall be accepted if the samples tested meet all the chemical composition and mechanical properties requirements of the specification.

10. RETESTS

10.1 If the test results of chemical analysis fail to satisfy the requirements for any of the constituents, two more tests for that constituents shall be done on the sample in order to confirm that the analysis has been done properly. If both the test results satisfy the relevant requirement, the lot shall be considered as conforming to the specification, otherwise not.

10.2 If any one of the samples first selected for mechanical test fail, two further samples from the same lot shall be taken one of which shall be from the rod/bar from which the original sample was taken unless the same rod/bar is withdrawn by the supplier.

10.2.1 If both these additional samples pass, the lot represented by the samples shall be deemed to comply with this standard. Should either of these additional samples fail, the lot represented by the samples shall be rejected.

11. PACKING

11.1 The material shall be supplied in bundles and strapped with loops and shall be suitably packed to avoid damage during transit, or as required by the purchaser.

12. MARKING

12.1 Suitable tags with markings made on them to show the name of the manufacturer, size, lot number, mass and any such information required by purchaser, shall be attached to each bundle of the material.

12.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

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